



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,047	04/27/2000	Hidetsugu Fukuyama	FURUYA CASE 1380	2869

7590 11/05/2003

Flynn Thiel Boutell & Tanis PC
2026 Rambling Rd
Kalamazoo, MI 49008-1699

EXAMINER

ARNOLD JR, JAMES

ART UNIT	PAPER NUMBER
----------	--------------

1764

DATE MAILED: 11/05/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/560,047

Applicant(s)

FUKUYAMA ET AL.

Examiner

James Arnold, Jr.

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 1764

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 July 2003 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 5-6 and 8-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudhakar et al. (USPN 5,624,547) in view of Hisamura et al (JP 09234370 A) and Olah et al.

The Sudhakar reference discloses a method of hydrocracking a heavy oil, which includes whole crude oils and residua, by contacting the heavy oil with a catalyst comprising iron (0.1 –

Art Unit: 1764

15%) and active carbon. See Column 5, lines 55-56 and Column 9, lines 10-20 and 50-60. The reference discloses a carbon support having a surface area of 100-2000 m²/g, a pore volume of 0.4-1.2 cm³/g, and an average pore diameter of 12-100 Å (1.2 to 10 nm). See Column 8, lines 5-15. The reference discloses process conditions which include the presence of hydrogen, a temperature of 250-450 C, and a pressure of 200-3000 psig. See column 6, lines 30-45. The reference also discloses hydrocracking conditions including a temperature of 380 C and a pressure of 1350 psig. See column 16, lines 5-25. The reference discloses vanadium and nickel as impurities. See Column 6, lines 10-12. The reference discloses a catalyst maintained in the fluid state. See Column 2, lines 20-23.

Sudhakar does not disclose asphaltene or residual carbon as impurities. The reference does not disclose a method wherein the catalyst has not been subjected to a pre-sulfurization reaction. The reference does not disclose a method wherein the heavy oil is at least one member selected from the group consisting of Middle-Eastern based Arabian heavy, Basra, Kafdi, Iranian heavy, vacuum residual oils, atmospheric distillation residual oils, Canadian Athabasca Bitumen Vacuum Distillation residual oils, Venezuelan Cerro Negro Atmospheric Distillation Residual Oils and Mexican Maya Vacuum Distillation Residual Oils. The reference does not disclose a method wherein heavy metals including vanadium, nickel, and asphaltene are removed during the contacting step. The reference does not disclose a method wherein coke generation is suppressed. The reference does not disclose a method whereby a catalyst is present during the first and second steps and the first step is conducted under a different reaction condition, including a lower temperature, than the second step. The reference does not disclose a method wherein the concentration of the catalyst is 6-40 wt% with respect to oil in the first and second

Art Unit: 1764

steps. The reference does not disclose a process wherein the catalyst is homogeneously dispersed in the reactor. The reference does not disclose a process wherein the heavy oil contains a heptane-insoluble matter in an amount of 9.08 to 23.5 wt%. The reference does not disclose a process wherein the heavy oil contains at least one of nickel and vanadium in a total amount of 230 to 760 ppm by weight. The reference does not disclose a method wherein the heavy oil contains fractions having a boiling point of not lower than 525 C in an amount of from 71.1 to 93.4% by volume.

The Hisamura reference discloses an MCH conversion rate of 40-85% and a mesopore volume of 20-500 A (2-50 nm) of 70% or more and an average pore diameter of 30-60 A (3-6 nm). See Abstract. The Olah reference discloses asphaltene as a constituent of heavy oil. See page 8. The Olah reference discloses Canadian and Venezuelan heavy oils. See page 7. Olah discloses that oil is a mixture of many hydrocarbons including many different types of alkanes. See Page 6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Sudhakar to utilize an MCH conversion rate of 40-85% and a mesopore volume of 20-500 A (2-50 nm) of 70% or more and an average pore diameter of 30-60 A (3-6 nm) because the catalyst in Hisamura is suitable for hydrocracking and the applicant's claimed ranges overlap with Hisamura's ranges. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Sudhakar to utilize Olah's asphaltene and to utilize residual carbons as impurities because asphaltene and carbons are typical constituents of heavy oils. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of

Art Unit: 1764

Sudhakar to utilize Canadian and Venezuelan heavy oils generally and to utilize Middle-Eastern based Arabian heavy, Basra, Kafdi, Iranian heavy, vacuum residual oils, atmospheric distillation residual oils, Canadian Athabasca Bitumen Vacuum Distillation residual oils, Venezuelan Cerro Negro Atmospheric Distillation Residual Oils and Mexican Maya Vacuum Distillation Residual Oils specifically because Sudhakar discloses the use of whole crude oils and also residua. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a method wherein coke generation is suppressed and to utilize a method wherein heavy metals including vanadium, nickel, and asphaltene are removed during the contacting step because applicant's claimed invention utilizes essentially the same feed subjected to essentially the same catalyst and conditions as Sudhakar. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process whereby a catalyst is present during the first and second steps and the first step is conducted under a different reaction condition, including a lower temperature, than the second step because the process conditions as illustrated by applicant for the first and second steps overlap and therefore it would be appropriate to adjust the temperatures within those ranges to attain optimum reaction performance. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a method wherein the concentration of the catalyst is 6-40 wt% with respect to oil in the first and second steps and wherein the catalyst is homogeneously dispersed in the reactor because the Sudhakar reference discloses a catalyst and it would be appropriate to use it in any effective weight percentage and because homogeneous dispersement of a catalyst allows for a more controlled reaction environment. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a method

Art Unit: 1764

wherein the heavy oil contains a heptane-insoluble matter in an amount of 9.08 to 23.5 wt% because there is a diversity of alkanes in heavy oil and it would be appropriate to utilize heavy oil constituent components that vary in weight percentage and molecular composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a method whereby the heavy oil contains at least one of nickel and vanadium in a total amount of 230 to 760 ppm by weight and a method wherein the heavy oil contains fractions having a boiling point of not lower than 525 C in an amount of from 71.1 to 93.4% by volume because Sudhaker generally discloses vanadium and nickel as impurities in heavy oil and because heavy oils have higher molecular weights than non-heavy oils and therefore have higher boiling points.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudhakar et al. (USPN 5,624,547) in view of Hisamura et al (JP 09234370 A) and Olah et al as applied to claims 5-6 and 8-22 above, and further in view of Adams et al. (USPN 3,900,390).

The Adams reference discloses that sulfiding is a known technique for increasing the activity of hydroprocessing catalysts. See column 7, lines 22-25.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to accept decreased catalyst activity by employing a catalyst that was not presulfided because the omission of a known modifier along with its known function is not inventive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Arnold, Jr. whose telephone number is 703-305-5308. The

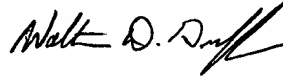
Art Unit: 1764

examiner can normally be reached on Monday-Thursday 8:30 AM-6:00 PM; Fridays from 8:30 AM-5:00 PM with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned are 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

ja
November 2, 2003


Walter D. Griffin
Primary Examiner